

AMENDMENTS TO THE CLAIMS

1. (Previously Amended) A method of generating hydrogen and oxygen gas, comprising steps of: injecting water molecules into a plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma, and removing each of the oxygen species and the hydrogen species from the plasma so that the hydrogen species forms gaseous hydrogen and the oxygen species forms gaseous oxygen.

2. (Currently Amended) A method of generating hydrogen and oxygen gas, comprising steps of: generating a plasma ~~The method of Claim 1 wherein the plasma is generated~~ in the microwave frequency segment of the electromagnetic spectrum, injecting water molecules into the plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma, and removing each of the oxygen species and the hydrogen species from the plasma so that the hydrogen species form gaseous hydrogen and the oxygen species form gaseous oxygen.

3. (Currently Amended) A method of generating hydrogen and oxygen gas, comprising steps of: generating a plasma ~~The method of Claim 1 wherein the plasma is generated~~ in the radio frequency segment of the electromagnetic spectrum, injecting water molecules into the plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma, and removing each of the oxygen species and the hydrogen species from the plasma so that the hydrogen species form gaseous hydrogen and the oxygen species form gaseous oxygen.

4. (Currently Amended) A method of generating hydrogen and oxygen gas, comprising steps of: generating a plasma ~~The method of Claim 1 wherein the plasma is generated~~ from low frequency electromagnetic waves, injecting water molecules into the plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma, and removing each of the oxygen species and the hydrogen species from the plasma so that the hydrogen species form gaseous hydrogen and the oxygen species form gaseous oxygen.

5. (Currently Amended) A method of generating hydrogen and oxygen gas, comprising steps of: generating a plasma ~~The method of Claim 1 wherein the plasma is generated from an arc discharge, injecting water molecules into the plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma, and removing each of the oxygen species and the hydrogen species from the plasma so that the hydrogen species form gaseous hydrogen and the oxygen species form gaseous oxygen.~~

6. (Previously Amended) The method of Claim 1 including the step of developing an electromagnetic field from a source of electrical energy to define a plasma reaction zone, with the water molecules being injected into the plasma reaction zone.

7. (Previously Amended) The method of Claim 6 wherein the electrical energy is developed from at least one of the following: solar energy, hydroelectric energy and geothermal energy.

8. (Previously Amended) The method of Claim 6 wherein the electrical energy is developed from a hydroelectric source, and at least a portion of water used by the hydroelectric source is recovered for use as the water molecules which are injected into the plasma.

9. (Previously Amended) The method of Claim 6 wherein the electrical energy is developed from a geothermal source in which water vapor is emitted, and at least a portion of the emitted water vapor is recovered for use as the water molecules which are injected into the plasma.

10. (Previously Amended) The method of Claim 1 further comprising the step of recovering waste steam to provide the injected water molecules.

11. (Previously Amended) The method of Claim 1 wherein a gas is injected into the plasma concurrently with the water molecules.

12. (Previously Amended) The method of Claim 11 wherein air is also injected into the plasma.

13. (Previously Amended) The method of Claim 11 wherein nitrogen is also injected into the plasma.

14. (Previously Amended) The method of Claim 11 wherein an inert gas is also injected into the plasma.

15. (Previously Amended) The method of Claim 14 wherein the inert gas injected into the plasma is selected from the group consisting of xenon, neon, krypton, helium, argon, and combinations thereof.

16. (Previously Amended) The method of Claim 1 wherein steam is also injected into the plasma.

17. (Currently Amended) A method of generating hydrogen and oxygen gas, comprising steps of: injecting water molecules into a plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species ~~The method of Claim 1 wherein wherein the hydrogen species are separated from the oxygen species~~ by passing the hydrogen species through a porous membrane having a plurality of pores with a diameter larger than the hydrogen species and smaller than the oxygen species such that only the hydrogen species can permeate through the membrane, and removing the oxygen species and the hydrogen species from the plasma so that the hydrogen species form gaseous hydrogen and the oxygen species form gaseous oxygen.

18. (Currently Amended) The method of Claim 17 wherein ~~wherein~~ the porous membrane is formed as a tube which is disposed within a nonporous tube with a reaction zone being formed between the tubes, and the water molecules are injected into the reaction zone from a first end of the nonporous tube.

19. (Previously Amended) The method of Claim 17 wherein the hydrogen species is passed through a plurality of membranes.

20. (Previously Amended) The method of Claim 17 wherein the membrane is electrically biased.

21. (Currently Amended) The method of Claim 20 wherein ~~wherein~~ the membrane is biased by applying a DC voltage to the membrane.

22. (Currently Amended) The method of Claim 20 wherein ~~wherein~~ the membrane is biased by applying an AC voltage to the membrane.

23. (Currently Amended) The method of Claim 22 wherein ~~wherein~~ the membrane is biased by applying a high frequency voltage to the membrane.

24. (Previously Amended) A method of generating hydrogen gas and oxygen gas, comprising steps of: injecting water molecules into a plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma by pumping the oxygen species and the hydrogen species through a converging diverging nozzle to form an exit beam wherein the oxygen species emerges from the nozzle substantially along a core of the beam and the hydrogen species migrates outwardly of the beam, and removing each of the hydrogen species and the oxygen species from the plasma so that the hydrogen species forms gaseous hydrogen and the oxygen species forms gaseous oxygen.

25. (Previously Amended) A method as set forth in claim 24 wherein the converging diverging nozzle is a Laval nozzle.

26. (Currently Amended) The method of Claim 1 wherein including the step of quenching of the oxygen species and the hydrogen species upon exiting ~~said~~ the plasma to prevent recombination thereof.

27. (Previously Amended) A method as set forth in claim 26 wherein the species are quenched by pumping the oxygen species and the hydrogen species through an expansion nozzle prior to quenching.

28. (Previously Amended) The method of Claim 1 including the step of developing an electrical potential across the plasma, with the potential interacting with different electrical potentials of the hydrogen species and the oxygen species to effect separation.

29. (Previously Amended) The method of Claim 1 including the step of developing a magnetic field across the plasma with the field interacting with different magnetic moments of the hydrogen species and the oxygen species to effect separation.

30. (Previously Amended) The method of Claim 29 including the step of developing an electrical potential across the plasma, with the potential interacting with different electrical potentials of the hydrogen species and the oxygen species to effect separation.

31. (Previously Amended) The method of Claim 1 including the step of introducing a catalyst into the plasma to effect termination of the active species in the hydrogen species and the oxygen species.

32. (Previously Amended) The method of Claim 1 including the step of introducing a homogenous reactant into the plasma to react with the oxygen species to prevent recombination of the oxygen species with the hydrogen species.

33. (Previously Amended) The method of Claim 32 including the step of introducing carbon monoxide such that an OH intermediate combines with the carbon monoxide and results in the production of hydrogen atoms and carbon dioxide.

34. (Previously Amended) The method of Claim 1 wherein a sacrificial component is introduced into the plasma to react with the oxygen species to prevent recombination of the oxygen species with the hydrogen species.

35. (Previously Amended) The method of Claim 34 including the step of introducing carbon such that an OH intermediate combines with the carbon and results in the production hydrogen atoms and carbon monoxide.

36. (Previously Amended) The method of Claim 1 wherein an atomic or molecular component is introduced into the plasma concurrently with the water molecules to inhibit recombination of the oxygen species and the hydrogen species

37. (Previously Amended) The method of Claim 36 wherein iodine is introduced into the plasma.

38. (Previously Amended) The method of Claim 1 wherein a cryothermic gas selected to be non-reactive with one of the oxygen species and the hydrogen species is introduced into the plasma to shock cool the oxygen species and the hydrogen species to prevent recombination thereof

39. (Previously Amended) The method of Claim 1 including the steps of recovering energy from the plasma and converting the recovered energy to a useful form.

40. (Previously Amended) The method of Claim 39 wherein the energy is recovered by inducing electrical current in electromagnets placed about the plasma from the electro-magnetic energy of the plasma.

41. (Previously Amended) The method of Claim 39 wherein the energy is recovered by placing a heat exchanger in proximity to the plasma to recover heat energy therefrom.

42. (Previously Amended) The method of Claim 39 wherein the energy is recovered by placing a heat pipe within the plasma to recover heat energy therefrom.

43. (Previously Amended) The method of Claim 39 wherein energy is recovered by placing solar cells in proximity to the plasma to recover light energy therefrom.

44. (Previously Amended) The method of Claim 39 wherein energy is recovered by placing a thermoelectric device in proximity to the plasma to recover electrical energy therefrom.

45. (Previously Amended) The method of Claim 39 wherein energy is recovered by placing a thermoionic device in proximity to the plasma to recover electrical energy therefrom.

46. (Previously Amended) The method of Claim 1 including the steps of injecting the water molecules into a first stream and injecting an inert gas into a second stream, with an angle ranging from 0° to 180° between the streams.

47. (Previously Amended) The method of Claim 1 wherein the plasma is a pulsed plasma.

48. (Previously Amended) The method of Claim 1 wherein the plasma is an oscillating plasma having a controlled frequency.

49. (Previously Amended) The method of Claim 1 wherein the plasma is an oscillating plasma having a variable frequency.

50. (Previously Amended) The method of Claim 1 wherein the plasma is developed at a pressure between 1 mtorr and 1000 atmospheres.

51. (Previously Amended) The method of Claim 1 wherein the plasma is developed at a temperature between 5 °C and 20,000° K.

52. (Currently Amended) A method of generating hydrogen and oxygen gas, comprising steps of: generating a plasma The method of Claim 1 wherein the plasma is developed at a frequency between 50 Hz and 100 GHz, injecting water molecules into the plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma, and removing

each of the oxygen species and the hydrogen species from the plasma so that the hydrogen species form gaseous hydrogen and the oxygen species form gaseous oxygen.

53. (Previously Amended) The method of Claim 1 further comprising the step of introducing a seed material into the plasma to lower the temperature of the plasma.

54. (Currently Amended) The method of Claim [[51]] 53 wherein the seed material ~~has a low ionization potential~~ is selected from the group consisting of CsCO₂, CsCl, K₂CO₃, KOH, KCl, NaCl, NaOH, Na₂CO₃ and combinations thereof.

55. (Currently Amended) The method of Claim [[54]] 53 wherein the seed material is selected from the group consisting of alkali, alkaline earth metals and combinations thereof.

56. (Currently Amended) The method of Claim [[52]] 53 wherein the seed material is mercury.

57. (Previously Amended) The method of Claim 1 including the step of introducing a catalyst into the plasma to terminate the oxygen species and the hydrogen species and to redirect the oxygen species and the hydrogen species to molecular hydrogen and molecular oxygen.

58. (Previously Amended) The method of Claim 57 wherein the catalyst ~~has a high surface area~~ is selected from the group consisting of silica gel, platinum, salts and metals, zinc chromite, metal oxides, argon, xenon, and other inert gases.

59. (Previously Amended) A method of generating hydrogen gas and oxygen gas, comprising steps of: injecting water molecules into a plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma, introducing a silica gel catalyst into the plasma to terminate the dissociation of the water molecules and to redirect the oxygen species and the hydrogen species to molecular hydrogen and molecular oxygen, and removing the molecular hydrogen and the molecular oxygen.

60. (Previously Amended) A method of generating hydrogen gas and oxygen gas, comprising steps of: injecting water molecules into a plasma to dissociate the molecules into a hydrogen species and an oxygen species, injecting nitrogen into the plasma concurrently with the water molecules such that nitric oxide is formed as a byproduct; separating the hydrogen species from the oxygen species within the plasma, removing each of the hydrogen species and the oxygen species from the plasma so that the hydrogen species forms gaseous hydrogen and the oxygen species forms gaseous oxygen, and injecting an acid post plasma such that the nitric oxide reacts with the acid to form a salt, thereby releasing molecular hydrogen.

61. (Previously Amended) The method of Claim 60 wherein the acid is phosphoric acid.